What is Claimed is:

- 1. A liquid polymer additive composition comprising:
 - (a) at least one phosphite ester selected from the group consisting of aryl phosphites, alkyl phosphites, aryl/alkyl phosphites, bisphenol-A phosphites, dialkylene glycol phosphites and polydialkylene glycol phosphites, pentaerythritol phosphites, p-cumyl phenol phosphites and blends thereof; and
 - (b) approximately from 50 to 800 ppm inclusive of zinc per hundred parts of a resin.
- 2. The composition of claim 1 wherein
 - (a) said zinc is from approximately 100 to 500 ppm.
- 3. The composition of claim 2 wherein
 - (a) said zinc is from approximately 100 to 250 ppm.
- 4. The composition of claim 1 wherein said at least one phosphite ester is selected from the group consisting of

aryl phosphites of formula (I)

wherein:

 R^1 is independently selected from the group consisting of H, C_{1-18} alkyl, C_{1-18} alkoxy, halogens; and

m is an integral value from 0 to 5 inclusive,

alkyl phosphites of formula (II)

$$\begin{bmatrix} R^2 - O - \end{bmatrix}_3 P$$
(II)

wherein:

R² is selected from the group consisting of C₁₋₁₈ alkyl,

alkyl/aryl phosphites of formula (III)

wherein:

R¹ is as previously defined;

R² is as previously defined;

m is an integral value from 0 to 5 inclusive; and n is an integral value from 1 to 2,

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}^{2} C(CH_{3})_{2}$$

Wherein

R¹ is as defined previously;

R³ is C₈₋₁₈ alkyl; and

m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ -CHCH_2O - CH_2CHO - P - O - C$$

wherein:

R¹ is as defined previously; m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive, pentaerythritol phosphites of formula (VI)

$$R^4-O-PO-R^4$$
(VI)

wherein:

 R^4 is selected from the group consisting of $\mathsf{C}_{8\text{-}18}$ alkyl; $\mathsf{C}_{6\text{-}30}$ aryl, $\mathsf{C}_{6\text{-}30}$ fused aryl rings, $\mathsf{C}_{7\text{-}35}$ alklaryl, $\mathsf{C}_{7\text{-}35}$ arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, $\mathsf{C}_{1\text{-}4}$ alkyl, and $\mathsf{C}_{1\text{-}4}$ alkoxy, and

p-cumyl phenol phosphites of formula (VII)

$$\begin{array}{c|c}
CH_3 \\
CH_3
\end{array}$$

$$\begin{array}{c|c}
O-P = O-R^5 \\
\end{array}$$
(VII)

wherein:

 R^5 is independently selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

- 5. The composition of claim 4 wherein
 - (a) a percentage weight loss of said composition as measured as a difference between a start and an end weight of said composition as measured after exposure to two hours at 110°C, is less than 1% by weight.
- 6. The composition of claim 5 wherein
 - (a) a percentage weight loss is less than 0.5% by weight.

7. The composition of claim 6 wherein said at least one phosphite ester is selected from the group consisting of

alkyl/aryl phosphites of formula (III)

wherein:

 R^1 is independently selected from the group consisting of H, C_{1-18} alkyl, C_{1-18} alkoxy, halogens; and

 R^2 is selected from the group consisting of C_{1-16} alkyl, m is an integral value from 0 to 5 inclusive; and n is an integral value from 1 to 2,

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}^{2}$$

Wherein

 R^1 is as defined previously; R^3 is C_{8-18} alkyl; and m is an integral value from 0 to 5 inclusive, polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix}_p CH_3 \\ CH_2CHO - P = \begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix}_2$$

$$\begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix}_p CH_2CHO - P = \begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix}_2$$

(V)

wherein:

R¹ is as defined previously; m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive,

pentaerythritol phosphites of formula (VI)

$$R^4-O-R^0$$
 $P-O-R^4$
(VI)

wherein:

R⁴ is selected from the group consisting of C₈₋₁₆ alkyl;
C₆₋₃₀ aryl, C₆₋₃₀ fused aryl rings, C₇₋₃₅ alklaryl,
C₇₋₃₅ arylalkyl, and substituted derivatives
thereof, wherein the substituents are selected
from the group consisting of halogens,
hydroxyl, C₁₋₄ alkyl, and C₁₋₄ alkoxy, and

p-cumyl phenol phosphite is of formula (VII)

$$\begin{array}{c|c}
CH_3 & O-P & O-R^5 \\
CH_3 & (VII)
\end{array}$$

 R^5 is independently selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

8. The composition of claim 7 wherein said at least one phosphite ester is selected from the group consisting of

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^3 - O)_2 - P - O & & \\
R^1_m & & \\
(IV)
\end{bmatrix}$$

Wherein

R¹ is independently selected from the group consisting of H, C₁₋₁₈ alkyl, C₁₋₁₈ alkoxy, halogens; and

R³ is C₈₋₁₈ alkyl; and m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_p CH_2CHO - P \begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_2$$

(V)

wherein:

R¹ is as defined previously;

m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive, and

pentaerythritol phosphites of formula (VI)

$$R^4-O-PO-R^4$$
(VI)

wherein:

 R^4 is selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

- 9. The composition of claim 8 wherein said composition is essentially free of barium, cadmium and calcium.
- 10. The composition of claim 7 wherein
 - (a) said phosphite ester is selected from the group consisting of

 $C_{12\text{-}15}$ bisphenol-A phosphite of formula (VIII)

$$\begin{bmatrix} (C_{12-15}H_{25-31}O)_2 - P - O - & C(CH_3)_2 \\ (VIII) \end{bmatrix}$$

 C_{10} bisphenol-A phosphite of formula (IX)

$$\begin{bmatrix}
(C_{10}H_{21}O)_2 - P - O \\
(IX)
\end{bmatrix}$$

tetraphenyl dipropylene glycol diphosphite of formula (X)

$$\begin{bmatrix} CH_3 & CH_3 \\ -D-D-CHCH_2O-CH_2CHO-P \\ 2 & (X) \end{bmatrix}_2$$

phenyl diisodecyl phosphite of formula (XI)

$$O-P = O-C_{10}H_{21}$$
(XI)

diphenyl isodecyl phosphite of formula (XII)

diphenyl 2-ethylhexyl phosphite of formula (XIII)

$$\begin{bmatrix}
C_2H_5 \\
P-O-CH_2CHC_4H_9
\end{bmatrix}$$
(XIII)

diisodecyl PE diphosphite of formula (XIV) and

$$C_{10}H_{21}-O-PO-C_{10}H_{21}$$
(XIV)

mono p-cumyl phenol diisodecyl phosphite of formula (XV)

- 11. A liquid polymer additive composition comprising:
 - (a) at least one phosphite ester selected from the group consisting of aryl phosphites, alkyl phosphites, aryl/alkyl phosphites, bisphenol-A phosphites, dialkylene glycol phosphites and polydialkylene glycol phosphites, pentaerythritol phosphites, p-cumyl phenol phosphites and blends thereof; and
 - (b) approximately from 50 to 800 ppm inclusive of zinc per hundred parts of a resin.
 - (c) said composition having a ratio of P/Zn of from at least about 8:1 to 75:1 inclusive.
- 12. The composition of claim 11 wherein
 - (a) said zinc is from approximately 100 to 500 ppm.
- 13. The composition of claim 12 wherein
 - (a) said zinc is from approximately 100 to 250 ppm.
- 14. The composition of claim 1 wherein said at least one phosphite ester is selected from the group consisting of

 R^1 is independently selected from the group consisting of H, C_{1-18} alkyl, C_{1-18} alkoxy, halogens; and

m is an integral value from 0 to 5 inclusive,

alkyl phosphites of formula (II)

$$\begin{bmatrix} R^2 - O \\ \end{bmatrix}_3$$
(II)

wherein:

 $$\rm R^2$ is selected from the group consisting of $C_{\text{1-18}}$ alkyl, alkyl/aryl phosphites of formula (III)

wherein:

R¹ is as previously defined;

R² is as previously defined;

m is an integral value from 0 to 5 inclusive; and n is an integral value from 1 to 2,

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}$$

R¹ is as defined previously;

 R^3 is C_{8-18} alkyl; and

m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_p CH_2CHO - P - O - CH_m CHO - P - O - CH_$$

wherein:

R¹ is as defined previously;

m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive,

pentaerythritol phosphites of formula (VI)

$$R^4-O-PO-R^4$$
(VI)

wherein:

 R^4 is selected from the group consisting of $\mathsf{C}_{8\text{-}18}$ alkyl; $\mathsf{C}_{6\text{-}30}$ aryl, $\mathsf{C}_{6\text{-}30}$ fused aryl rings, $\mathsf{C}_{7\text{-}35}$ alklaryl, $\mathsf{C}_{7\text{-}35}$ arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, $\mathsf{C}_{1\text{-}4}$ alkyl, and $\mathsf{C}_{1\text{-}4}$ alkoxy, and

p-cumyl phenol phosphites of formula (VII)

$$\begin{array}{c|c}
CH_3 & O-P & O-R^5 \\
CH_3 & (VII)
\end{array}$$

 R^5 is independently selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

- 15. The composition of claim 14 wherein
 - (a) a percentage weight loss of said composition as measured as a difference between a start and an end weight of said composition as measured after exposure to two hours at 110°C, is less than 1% by weight.
- 16. The composition of claim 15 wherein
 - (a) a percentage weight loss is less than 0.5% by weight.
- 17. The composition of claim 16 wherein said at least one phosphite ester is selected from the group consisting of alkyl/aryl phosphites of formula (III)

wherein:

R¹ is independently selected from the group consisting of H, C₁₋₁₈ alkyl, C₁₋₁₈ alkoxy, halogens; and

 R^2 is selected from the group consisting of C_{1-18} alkyl, m is an integral value from 0 to 5 inclusive; and n is an integral value from 1 to 2,

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}$$

Wherein

R¹ is as defined previously;

R³ is C₈₋₁₈ alkyl; and

m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_p CH_3 \\ CH_2CHO - P - O - CH_2CHO - P - CH_2CHO - P - O - CH_2CHO - P - O$$

wherein:

R¹ is as defined previously; m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive,

pentaerythritol phosphites of formula (VI)

$$R^4-O-R$$
 $O-R^4$
 $O-R^4$
 $O-R^4$
 $O-R^4$
 $O-R^4$

wherein:

 R^4 is selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy, and

p-cumyl phenol phosphite is of formula (VII)

$$\begin{array}{c|c}
CH_3 \\
CH_3 \\
CH_3
\end{array}$$
(VII)

 R^5 is independently selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

18. The composition of claim 7 wherein said at least one phosphite ester is selected from the group consisting of bisphenol-A phosphites of formula (IV)

$$(R^3-O)_2-P-O$$
 R^1_m
(IV)

Wherein

 R^1 is independently selected from the group consisting of H, C_{1-18} alkyl, C_{1-18} alkoxy, halogens; and R^3 is C_{8-18} alkyl; and m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O - CH_2CHO - P - O - CH$$

wherein:

R¹ is as defined previously;

m is an integral value from 0 to 5 inclusive; and
p is an integral value from 0 to 1 inclusive, and
pentaerythritol phosphites of formula (VI)

$$R^4-O-R^0$$
 $P-O-R^4$
(VI)

wherein:

R⁴ is selected from the group consisting of C₈₋₁₈ alkyl;

C₆₋₃₀ aryl, C₆₋₃₀ fused aryl rings, C₇₋₃₅ alklaryl,

C₇₋₃₅ arylalkyl, and substituted derivatives

thereof, wherein the substituents are selected

from the group consisting of halogens,

hydroxyl, C₁₋₄ alkyl, and C₁₋₄ alkoxy.

- 19. The composition of claim 18 wherein said composition is essentially free of barium, cadmium and calcium.
- 20. The composition of claim 17 wherein
 - (a) said phosphite ester is selected from the group consisting of

 C_{12-15} bisphenol-A phosphite of formula (VIII)

$$\begin{bmatrix} (C_{12-15}H_{25-31}O)_2 - P - O - O - C(CH_3)_2 \\ (VIII) \end{bmatrix}$$

C₁₀ bisphenol-A phosphite of formula (IX)

$$\begin{bmatrix} (C_{10}H_{21}O)_2 - P - O & & \\$$

tetraphenyl dipropylene glycol diphosphite of formula (X)

$$\begin{bmatrix} CH_3 & CH_3 \\ P-O-CHCH_2O-CH_2CHO-P & O \end{bmatrix}_2$$
(X)

phenyl diisodecyl phosphite of formula (XI)

$$O-P = O-C_{10}H_{21}$$
(XI)

diphenyl isodecyl phosphite of formula (XII)

diphenyl 2-ethylhexyl phosphite of formula (XIII)

$$\begin{bmatrix} C_2H_5 \\ P-O-CH_2CHC_4H_5 \end{bmatrix}$$
(XIII)

diisodecyl PE diphosphite of formula (XIV) and

$$C_{10}H_{21}-O-P$$
 $O-C_{10}H_{21}$
 $O-C_{10}H_{21}$
 $O-C_{10}H_{21}$
 $O-C_{10}H_{21}$

mono p-cumyl phenol diisodecyl phosphite of formula (XV)

$$\begin{array}{c|c}
CH_3 & O-P = O-C_{10}H_{21} \\
CH_3 & (XV)
\end{array}$$

- 21. An essentially toxic-metal free liquid polymer additive composition for use as at least a partial replacement of toxic metal stabilizer additive compositions for use in vinyl-containing resins, wherein the essentially toxic-free composition consists essentially of:
 - (a) at least one phosphite ester selected from the group consisting of aryl phosphites, alkyl phosphites, aryl/alkyl phosphites, bisphenol-A phosphites, dialkylene glycol phosphites and polydialkylene glycol phosphites, pentaerythritol phosphites, p-cumyl phenol phosphites and blends thereof; and
 - (b) approximately from 50 to 800 ppm inclusive of zinc per 100 parts of a resin.
- 22. The composition of claim 21 wherein
 - (a) said zinc is from approximately 100 to 500 ppm.
- 23. The composition of claim 22 wherein
 - (a) said zinc is from approximately 100 to 250 ppm.
- 24. The composition of claim 21 wherein said at least one phosphite ester is selected from the group consisting of

aryl phosphites of formula (I)

$$\begin{bmatrix} & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & & \\ & & \\ & & & \\ & \\ & & \\ & \\ & & \\ & \\ & \\ & & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\$$

R¹ is independently selected from the group consisting of H, C₁₋₁₈ alkyl, C₁₋₁₈ alkoxy, halogens; and

m is an integral value from 0 to 5 inclusive,

alkyl phosphites of formula (II)

$$\begin{bmatrix} R^2 - O - P \\ & \end{bmatrix}_3$$
(II)

wherein:

 $$\rm R^2$ is selected from the group consisting of $C_{\text{1-18}}$ alkyl, alkyl/aryl phosphites of formula (III)

wherein:

R¹ is as previously defined;
R² is as previously defined;
m is an integral value from 0 to 5 inclusive; and
n is an integral value from 1 to 2,

bisphenol-A phosphites of formula (IV)

$$(R^3-O)_2-P-O$$
 R^1_m
 (IV)

R¹ is as defined previously;

R³ is C₈₋₁₈ alkyl; and

m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_p CH_2CHO - P \begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_2$$

(V)

wherein:

R¹ is as defined previously; m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive,

pentaerythritol phosphites of formula (VI)

$$R^4 - O - P O - R^4$$
(VI)

wherein:

 R^4 is selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy, and

p-cumyl phenol phosphites of formula (VII)

 R^5 is independently selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

- 25. The composition of claim 24 wherein
 - (a) a percentage weight loss of said composition as measured as a difference between a start and an end weight of said composition as measured after exposure to two hours at 110°C, is less than 1% by weight.
- 26. The composition of claim 25 wherein
 - (a) a percentage weight loss is less than 0.5% by weight.
- 27. The composition of claim 26 wherein said at least one phosphite ester is selected from the group consisting of alkyl/aryl phosphites of formula (III)

Wherein:

 R^1 is independently selected from the group consisting of H, C_{1-18} alkyl, C_{1-18} alkoxy, halogens; and

 R^2 is selected from the group consisting of C_{1-18} alkyl, m is an integral value from 0 to 5 inclusive; and n is an integral value from 1 to 2,

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}$$

Wherein

R¹ is as defined previously;

R³ is C₈₋₁₈ alkyl; and

m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O & CH_2CHO - P \\ R^1_m & (V) \end{bmatrix}_2$$

Wherein:

R¹ is as defined previously; m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive,

pentaerythritol phosphites of formula (VI)

$$R^4-O-PO-PO-R^4$$
(VI)

Wherein:

 R^4 is selected from the group consisting of $C_{8\text{-}18}$ alkyl; $C_{6\text{-}30}$ aryl, $C_{6\text{-}30}$ fused aryl rings, $C_{7\text{-}35}$ alklaryl, $C_{7\text{-}35}$ arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, $C_{1\text{-}4}$ alkyl, and $C_{1\text{-}4}$ alkoxy, and

p-cumyl phenol phosphite is of formula (VII)

$$\begin{array}{c|c}
CH_3 \\
CH_3 \\
CH_3
\end{array}$$
(VII)

Wherein:

 R^5 is independently selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy.

28. The composition of claim 27 wherein said at least one phosphite ester is selected from the group consisting of

bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}^{2}$$

wherein

R¹ is independently selected from the group consisting of H, C₁₋₁₈ alkyl, C₁₋₁₈ alkoxy, halogens; and

 R^3 is C_{8-18} alkyl; and

M is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix} = \begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix} = \begin{bmatrix} CH_3 \\ CH_2CHO - P \end{bmatrix} = \begin{bmatrix} CH_3 \\ CHCH_2O \end{bmatrix} = \begin{bmatrix} C$$

(V)

wherein:

R¹ is as defined previously;

M is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive, and

Pentaerythritol phosphites of formula (VI)

$$R^4 - O - P O - R^4$$
(VI)

wherein:

R⁴ is selected from the group consisting of C₈₋₁₈ alkyl;

C₆₋₃₀ aryl, C₆₋₃₀ fused aryl rings, C₇₋₃₅ alklaryl,

C₇₋₃₅ arylalkyl, and substituted derivatives

thereof, wherein the substituents are selected

from the group consisting of halogens,

hydroxyl, C₁₋₄ alkyl, and C₁₋₄ alkoxy.

- 29. The composition of claim 28 wherein said composition is essentially free of barium, cadmium and calcium.
- 30. The composition of claim 27 wherein
 - (a) said phosphite ester is selected from the group consisting of

C₁₂₋₁₅ bisphenol-A phosphite of formula (VIII)

$$\begin{bmatrix} (C_{12\cdot15}H_{25\cdot31}O)_2 - P - O - O - C(CH_3)_2 \\ (VIII) \end{bmatrix}$$

C₁₀ bisphenol-A phosphite of formula (IX)

tetraphenyl dipropylene glycol diphosphite of formula (X)

$$\begin{bmatrix} CH_3 & CH_3 \\ P-O-CHCH_2O-CH_2CHO-P \\ 2 & (X) \end{bmatrix}_2$$

phenyl diisodecyl phosphite of formula (XI)

$$O-P = O-C_{10}H_{21}$$
(XI)

diphenyl isodecyl phosphite of formula (XII)

diphenyl 2-ethylhexyl phosphite of formula (XIII)

$$\begin{bmatrix} C_2H_5 \\ P-O-CH_2CHC_4H_9 \end{bmatrix}$$
(XIII)

diisodecyl PE diphosphite of formula (XIV) and

$$C_{10}H_{21}-O-PO-C_{10}H_{21}$$
(XIV)

mono p-cumyl phenol diisodecyl phosphite of formula (XV)

$$\begin{array}{c|c}
 & CH_3 \\
 & CH_3
\end{array}$$

$$\begin{array}{c|c}
 & CH_3 \\
 & CH_3
\end{array}$$

$$\begin{array}{c|c}
 & CH_2 \\
 & CH_3
\end{array}$$
(XV)

- 31. A additive composition for polyvinyl chloride resin which comprises:
 - (a) At least one phosphite ester selected from the group consisting of bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^{3}-O)_{2}-P-O & & \\
& & \\
R^{1}_{m} & & \\
(IV)
\end{bmatrix}$$

wherein

R¹ is independently selected from the group consisting of H, C₁₋₁₈ alkyl, C₁₋₁₈ alkoxy, halogens; and R³ is C₈₋₁₈ alkyl; and m is an integral value from 0 to 5 inclusive,

polydialkylene glycol phosphites of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O \end{bmatrix}_p CH_3 CH_2CHO - P - O - CH_2CHO - P -$$

(V)

wherein:

R¹ is as defined previously; m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive,

Pentaerythritol phosphites of formula (VI)

$$R^4-O-PO-PO-R^4$$
(VI)

wherein:

 R^4 is selected from the group consisting of C_{8-18} alkyl; C_{6-30} aryl, C_{6-30} fused aryl rings, C_{7-35} alklaryl, C_{7-35} arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C_{1-4} alkyl, and C_{1-4} alkoxy, and

p-cumyl phenol phosphite is of formula (VII)

$$\begin{array}{c|c}
CH_3 \\
CH_3
\end{array}$$

$$\begin{array}{c|c}
O-P = O-R^5 \\
\end{array}$$
(VII)

R⁵ is independently selected from the group consisting of C₈₋₁₈ alkyl; C₆₋₃₀ aryl, C₆₋₃₀ fused aryl rings, C₇₋₃₅ alklaryl, C₇₋₃₅ arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, C₁₋₄ alkyl, and C₁₋₄ alkoxy; and

- (b) approximately from 100 to 500 ppm zinc inclusive per 100 parts resin.
- 32. The composition of claim 31 wherein
 - (a) said phosphite esters range from approximately about 1 to 8 phr inclusive; and
 - (b) said zinc ranges from approximately about 50 to 800 ppm per hundred parts resin and further wherein said zinc is a zinc carboxylate.
- 33. The composition of claim 32 wherein
 - (a) said phosphite esters range from approximately about 2 to 4 phr inclusive; and
 - (b) said zinc ranges from approximately about 100 to 500 ppm per hundred parts resin and further wherein said zinc carboxylate is selected from the group consisting of zinc octoate, zinc 2-ethylhexoate, zinc hexoate, zinc neodecoate, zinc, decoate, zinc dodecanoate, zinc isostearate, zinc oleate, zinc stearate, zinc tallow fatty acids, zinc palmitate, zinc myristate, zinc laurate, and zinc benzoate.
- 34. The composition of claim 33 wherein
 - (a) said phosphite esters range from approximately about 2 to 4 phr inclusive; and
 - (b) said zinc ranges from approximately about 100 to 250 ppm per hundred parts resin.
- 35. The composition of claim 34 wherein
 - (a) said phosphite is selected from the group consisting of Bisphenol-A phosphites of formula (IV)

$$\begin{bmatrix}
(R^3 - O)_2 - P - O & & & \\
R^1_m & & & \\
(IV)
\end{bmatrix}$$

R¹ is independently selected from the group consisting of H, C₁₋₁₈ alkyl, C₁₋₁₈ alkoxy, halogens; and R³ is C₈₋₁₈ alkyl; and M is an integral value from 0 to 5 inclusive,

- 36. The composition of claim 35 wherein
 - (a) said phosphite ester is selected from the group consisting of

C₁₂₋₁₅ bisphenol-A phosphite of formula (VIII) and

C₁₀ bisphenol-A phosphite of formula (IX)

$$\begin{bmatrix} (C_{10}H_{21}O)_2 - P - O - O - C(CH_3)_2 \\ (IX). \end{bmatrix}$$

- 37. The composition of claim 31 wherein
 - (a) said phosphite ester is

p-cumyl phenol phosphite is of formula (VII)

 R^5 is independently selected from the group consisting of $C_{8\text{-}18}$ alkyl; $C_{6\text{-}30}$ aryl, $C_{6\text{-}30}$ fused aryl rings, $C_{7\text{-}35}$ alklaryl, $C_{7\text{-}35}$ arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, $C_{1\text{-}4}$ alkyl, and $C_{1\text{-}4}$ alkoxy.

- 38. The composition of claim 31 wherein
 - (a) said phosphite is

Pentaerythritol phosphite of formula (VI)

$$R^4-O-PO-PO-R^4$$
(VI)

wherein:

 R^4 is selected from the group consisting of $\mathsf{C}_{8\text{-}18}$ alkyl; $\mathsf{C}_{6\text{-}30}$ aryl, $\mathsf{C}_{6\text{-}30}$ fused aryl rings, $\mathsf{C}_{7\text{-}35}$ alklaryl, $\mathsf{C}_{7\text{-}35}$ arylalkyl, and substituted derivatives thereof, wherein the substituents are selected from the group consisting of halogens, hydroxyl, $\mathsf{C}_{1\text{-}4}$ alkyl, and $\mathsf{C}_{1\text{-}4}$ alkoxy.

- 39. The composition of claim 38 wherein
 - (a) said phosphite is selected from the group consisting of

- 40. The composition of claim 31 wherein
 - (a) said phosphite ester is a

Polydialkylene glycol phosphite of formula (V)

$$\begin{bmatrix} CH_3 & CH_3 \\ CHCH_2O & CH_2CHO - P \\ R^1_m & CHCH_2O & CH_2CHO - P \end{bmatrix}_2$$

$$(V)$$

wherein:

 R^1 is independently selected from the group consisting of H, C_{1-18} alkyl, C_{1-18} alkoxy, halogens;

m is an integral value from 0 to 5 inclusive; and p is an integral value from 0 to 1 inclusive.

- 41. The composition of claim 40 wherein
 - (a) said polydialkylene glycol phosphite is selected from the group consisting of

$$\begin{bmatrix} CH_3 & CH_3 \\ P-O-CHCH_2O-CH_2CHO-P & O \end{bmatrix}_2 \text{ and}$$

$$\begin{bmatrix} CH_3 & CH_3 \\ P-O-CHCH_2O-CH_2CHO-P & O \end{bmatrix}_2$$